

# **AST Classifications Index**



## **Subgroup 740-00 through 749-99**

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# **AST** Subgroup Description



**AST: 74000 - 74999**

**Facilities and Operations Subgroups**

**AST - Experimental Facilities Development: 740-02**

**OPM Title - Experimental Facilities Development: GS-801-0**

1. This specialty includes positions which involve planning, designing, and developing of facilities, systems, and equipment used in the conduct of aerospace research, development, and operations programs. Facilities and equipment include wind tunnels, propulsion test stands, scientific laboratories, space environment chambers, launch and ground support equipment, specialized test systems, flight tracking and data-gathering facilities, excluding electronic systems, pressure vessels, flight and other environment simulators, etc. The basic nature or process of the equipment or facilities may be mechanical, chemical, structural, aeronautical, or other related and associated functions, and typically involve a combination of engineering considerations in addition to electrical, power, and electronic controls. Typically, work extends to the modification, construction, checkout, and acceptance of facilities and may include activities associated with the maintenance and operation of the facilities and equipment. Individual positions may also be engaged in the planning, direction, coordination, and evaluation of contracted efforts in this type of work.

2. Knowledges required to perform this work span conventional engineering or physical science disciplines, e.g., structural, civil, mechanical, electrical, chemical, mathematics, architectural, aerospace, physics. Additionally, the positions require a knowledge of the aerospace program being supported; of the safety considerations unique to the project; of the operational

characteristics of the facilities, systems, and equipment, and problem-solving ability.

**AST - Facility Systems Safety: 740-03**  
**OPM Title - Facility Systems Safety: GS-801-0**

1. a. This specialty includes positions responsible for identifying and controlling hazards in aerospace or aeronautical engineering, scientific research, or development facilities and facility operations. This includes evaluating, coordinating, monitoring, and performing engineering systems safety analyses of facilities, systems, equipment, and operations. Facilities include wind tunnels, test facilities and stands, laboratories, space environment chambers, vibration and acoustic equipment, launch operation facilities, pressure vessels, static and dynamic flight trainers, and so forth.

b. Positions also may be responsible for evaluating safety techniques and procedures associated with the design, development, construction, modification, and/or operation of aerospace or aeronautical facilities, systems, and related equipment. These duties include:

(1) Developing, implementing, and evaluating engineering safety policies, standards, and directives.

(2) Conducting systems safety trade-off studies.

(3) Evaluating configuration management controls.

(4) Reviewing human engineering assessments.

(5) Evaluating hazards, fault-tree, sneak circuit, and failure mode effect analyses.

(6) Providing conceptual safety guidance during the definition phase of programs, providing engineering systems safety analysis during program operations, evaluating incident and mishap investigation results, and recommending systems safety adjustments in research and development activities. Provides safety analysis report (SAR) defining risk being assumed for program management approval.

2. The work requires interdisciplinary engineering and/or physical science knowledges appropriate to the specific aerospace facility, system, or equipment with which the position is concerned. Work in this specialty requires consideration of problems peculiar to the aerospace research and development environment, as well as a knowledge of aerospace program objectives and the risk management concepts fundamental to accomplishing these objectives. These positions employ and utilize system safety techniques and apply them to ground systems, ground support equipment, research, development, test facilities, and facility operations.

**AST - Mechanical Experimental Equipment: 740-10**  
**OPM Title - Mechanical Engineer: GS-830-0**

1. This specialty includes positions responsible for planning, developing, designing, testing, or evaluating mechanical, electromechanical, pneumatic, hydraulic, and structural equipment and systems for aerospace programs. The work requires analysis of program objectives in terms of specific requirements and the planning, developing, and/or designing of models, tools, tooling devices, special mechanical devices, articulations, and machinery, e.g., space structural models, arc chambers, remotely controlled models, test sections or stands, required to fulfill program objectives. Included are positions concerned with monitoring contractors engaged in this work.

2. The work requires a detailed knowledge of mechanical systems and consideration of phenomena peculiar to aerospace research and development. Knowledges, although primarily mechanical, span conventional engineering and/or physical science disciplines, such as mechanical, aerospace, aeronautical, materials, electrical, chemical, and physics.

**AST - Gas and Fluid Systems: 740-15**  
**OPM Title - Gas and Fluid Systems: GS-801-0**

1. This specialty includes positions responsible for the development and design of systems and equipment for achieving, changing, or controlling gases or liquids used in aerospace systems and related support equipment. Work involves the performance of applied research and experimentation to develop new concepts of design and construction specifications for equipment and systems for compressing, storing, piping, evacuating, heating, drying, purifying, purging, cooling, liquefying, sensing, and mixing fluids and/or gases under extreme conditions and performance requirements. Included are positions concerned with monitoring contractors engaged in this work.

2. Knowledges required to perform this work span conventional engineering or physical science disciplines, e.g., structural, chemical, mechanical, control systems, aerospace, and physics. Additionally, positions require detailed knowledges of both the properties and compatibilities of gases or fluids and the structural systems worked with. Positions must include cognizance of new developments in associated systems, unique safety considerations, and programmatic and policy constraints.

## **AST - Electrical Experimental Equipment: 740-20**

### **OPM Title - Electrical Engineer: GS-850-0**

1. This specialty includes positions which involve planning, designing, and developing of electrical equipment and systems used to power and control specialized research and development facilities, equipment, and process systems. The equipment and systems developed are integrated or associated with such facilities as wind tunnels, test stands, scientific laboratories, space environment chambers, launch and ground support equipment, arc jets, specialized test systems, flight simulators, computational facilities, and tracking and data gathering facilities. Typical equipment includes special test control panels, servo systems, wind tunnel drive systems, power distribution systems, and switching gear, automated controls of test equipment, motor-generator equipment, and primary power substations, with related electronic sensing, measuring and control devices. Typically, work extends to the modification, construction, checkout, and acceptance of equipment and systems and may include activities associated with the maintenance and operation of facilities. Individual positions also may be engaged in the planning, direction, coordination, and evaluation of contracted efforts in this type of work.

2. This work requires a detailed knowledge of electrical systems, experimental programs, and consideration of phenomena peculiar to aerospace research and development. Knowledge, although primarily electrical, spans conventional engineering and physical science disciplines such as electrical, electronics, aerospace, aeronautical, physics, chemical, and mechanical.



**AST - Experimental Facilities Techniques: 740-25**  
**OPM Title - Experimental Facilities Techniques: GS-**  
**801-0**

1. This specialty includes positions which involve the use and operation of experimental facilities and equipment, including the design and development of procedures, techniques, and methods of equipment operation, the design of facility modifications to meet changing research or test requirements, the establishment of test conditions and operations safety requirements, and the analysis and validation of test data. Typical facilities include manned and unmanned simulators, wind tunnels, hypervelocity ballistic ranges, hyperbaric and hypobaric test facilities both manned and unmanned, high vacuum-high voltage chambers, vibration and acoustic test facilities, and specialized structural and high/low temperature test facilities with associated power and support equipment and mechanical, electrical and electronics data sensing, gathering, and reduction devices and instrumentation. Incumbents also may participate in the screening and selection of proposed test projects, the direction and monitoring of contractor operations, and conduct of applied research.

2. This work requires a detailed knowledge of the experimental program, as well as a complete knowledge of the physical and operational characteristics of specific facilities and equipment. The work is interdisciplinary and spans engineering and physical science fields such as mechanical, aerospace, aeronautical, electrical, structural engineering, optics, and physics.

**AST - Flight Training: 745-02**  
**OPM Title - Flight Training: GS-801-0**

1. This specialty includes positions responsible for:
  - a. Establishing mission-specific technical training requirements and objectives for members of spaceflight crews and flight control personnel assigned to perform and support manned spaceflight operations.
  - b. Conducting engineering analysis to develop and validate crew procedures for extravehicular (EVA) and intravehicular (IVA) activity performed during manned spaceflights and to produce appropriate cue cards, checklists, and handbooks for approved EVA and IVA procedures.
  - c. Providing technical training of spaceflight crews and ground personnel through briefings, classroom instructions, part-task trainers, one-g trainers, water tank facilities, part-task simulators, mission simulators, and other specialized facilities and trainers.
  - d. Establishing hardware, software, and physical plant requirements for aeronautical and aerospace training facilities and equipment such as mission trainers, simulators, and related support equipment.
2. Knowledges required to perform this work span conventional engineering or physical science disciplines, such as aerospace, aeronautical, mechanical, electrical, and physics.

**AST - Flight Systems Operations: 745-03**  
**OPM Title - Flight Systems Operations: GS-801-0**

1. This specialty includes positions responsible for:
  - a. Developing operational concepts, plans, and procedures for spacecraft hardware and software systems as required for the real-time flight control of manned spacecraft and unmanned space vehicles. This includes system-related flight control techniques, programs, procedures, and documentation.
  - b. Analysis of integrated spacecraft and payload systems in order to identify potential in-flight malfunctions and contingencies and to develop required detection and corrective procedures.
  - c. Participating in mission, spacecraft, and on-board systems design activities necessary to ensure compatibility between mission objectives, vehicle capabilities, crew safety, and mission success.
  - d. Planning, developing, coordinating, and directing real-time operations for manned and unmanned spaceflight.
2. Knowledges required to perform this work span conventional engineering or physical science disciplines such as aerospace, aeronautical, mechanical, electrical, and physics.

**AST - Mission Support Requirements and  
Development: 745-04**  
**OPM Title - Mission Support Requirements and  
Development: GS-801-0**

1. This specialty includes positions responsible for developing and analyzing operational concepts, requirements, plans, schedules, and documentation for planning, conducting, and evaluating spaceflight operations. This includes:

- a. Mission control, payload operations control, and flight control network operational requirements, plans, procedures, and concepts.
- b. Mission and crew operational requirements, data acquisition requirements, and technical documentation requirements for spacecraft systems products.
- c. Spaceflight-related ground support systems requirements for data acquisition and/or mission control management.
- d. Ground support systems and data base concepts and requirements to support premission planning and scheduling.
- e. Integrated computer hardware and software systems to determine suitability to present and future spaceflight mission requirements.

2. Knowledges required to perform this work span conventional engineering or physical science disciplines, such as aerospace, aeronautical, mechanical, electrical, and physics.

**AST - Mission Operations Integration: 745-05**  
**OPM Title - Mission Operations Integration: GS-801-0**

1. This specialty includes positions responsible for the overall management and integration of the operations activities required to support manned spaceflight missions. Specific areas of responsibility include:

- a. Management and integration of the flight products required to configure flight and ground systems, train flight crews and ground support personnel, conduct mission operations, and accomplish mission objectives.
- b. Development, control, and implementation of flight systems hardware and software operational requirements.
- c. Assessment of the capability of the various NASA centers to support operational requirements.
- d. Planning, directing, and controlling the activities of the ground support team, including certifying the proficiency of flight control team member.
- e. Conducting post-flight mission evaluations to ensure that mission objectives were met, problem areas identified, and corrective action taken.

2. Knowledges required to perform this work span conventional engineering or physical science disciplines, such as aerospace, aeronautical, mechanical, electrical, and physics.

**AST - Flight Activity Planning: 745-06**  
**OPM Title - Flight Activity Planning: GS-801-0**

1. This specialty includes positions responsible for:
  - a. Developing and validating flight procedures and crew activity plans for the various phases of spaceflight missions.
  - b. Developing flight data files for spaceflight missions.
  - c. Defining requirements for crew activity planning aids including automated schedulers, data bases, real-time data displays, control center consoles, checklists, handbooks, and cue cards.
  - d. Defining real-time mission support requirements, plans, and procedures for trajectory monitoring and control utilizing ground radar tracking and on-board navigation, guidance, and control systems for all phases of flight, including launch, on-orbit, atmosphere entry, and landing.
  - e. Establishing trajectory display and computational requirements for both the ground and airborne computing systems.
  - f. Providing flight procedures expertise to spacecraft hardware and software development efforts.
2. Knowledges required to perform this work span conventional engineering or physical science disciplines such as aerospace, aeronautical, mechanical, electrical, physics, and chemical.

**AST - Mission Specialist Astronaut: 745-07**  
**OPM Title - Mission Specialist Astronaut: GS-1301-0**

1. This specialty includes positions responsible for serving as a mission specialist astronaut during manned space flights. During flight, mission specialist astronauts have the overall responsibility for the coordination, with the commander and pilot, of spacecraft operations in the areas of crew activity planning, consumables usage, and other spacecraft activities affecting experiment operations. They may participate in extravehicular activities, perform special payload handling or maintenance operations, and assist in specific experiment operations. During nonflight periods, the mission specialist astronaut will be involved in activities such as the following:

- a. Undergoing training and simulations for specific future missions.
- b. Providing flight crew input into the design, development, or modifications for spacecraft systems and subsystems, payload operations planning, and flight crew equipment development.
- c. Serving as a member of mission control teams as a capsule communicator or payload officer. Providing flight crew input into prelaunch and post-mission activities.
- d. Staying abreast of the state-of-the-art in their area of specialty including proposing potential investigations, experiments, or payloads to be flown during space flight missions.

2. Incumbents of these positions apply a detailed knowledge of the spacecraft and payload systems and their operational characteristics, the mission requirements and objectives, the supporting systems and equipment for each of the experiments conducted on assigned missions, and proficiency in payload operations. The work is interdisciplinary and spans scientific and engineering disciplines.

## **AST - Pilot Astronaut: 745-08**

### **OPM Title - Aerospace Engineer and Pilot:**

#### **GS-861-0**

1. This specialty includes positions responsible for serving as pilot astronauts for manned space flights. Pilot astronauts will serve as both spacecraft commanders and pilots. During flight, the commander will have on-board responsibility for the space vehicle, crew, mission success, and safety of flight. The pilot will assist the commander in controlling and operating the spacecraft. In addition, pilots may deploy and retrieve payloads, participate in extravehicular activities, and support specific payload operations where appropriate. During nonflight periods, the pilot astronaut will be involved in activities such as the following:

- a. Undergoing mission-specific training and simulations for future missions.
- b. Providing flight crew input into the design, development, or modification of spacecraft systems, subsystems, and flight crew equipment.
- c. Serving as a member of mission control teams in the position of capsule communicator and/or providing flight crew input into prelaunch and post-mission activities.
- d. Piloting chase aircraft during the launch and landing phases of space flight missions.

2. Incumbents of these positions require a detailed knowledge of spacecraft operations, mission requirements, and spacecraft systems and associated crew interfaces. In addition, they require proficiency in piloting high-performance, fixed-wing aircraft. The work, although primarily aerospace or aeronautical, is interdisciplinary and spans conventional engineering and scientific disciplines.



## **AST - Research Piloting: 745-10**

### **OPM Title - Aerospace Engineer and Pilot:**

#### **GS-861-0**

1. This specialty includes positions which involve the piloting of aircraft used in research, development, and test programs, evaluating test parameters, performing flight and/or ground simulations of advanced missions and aircraft, and actively participating with project engineers and scientists responsible for the development, design, testing, evaluation, and reporting on new aircraft concepts and/or new advanced aircraft systems. This includes:

- a. Piloting one-of-a-kind or highly modified research and development aircraft and/or advanced simulators in conjunction with research and test projects. This includes the definition of requirements pertaining to aircraft stability and control, equipment performance, pilot needs, escape systems, on-board, and ground support equipment.
- b. Conducting reduced gravity research and test projects, including evaluating pilot tolerance and efficiency in various acceleration fields and during zero-g conditions.
- c. Providing consultation and technical inputs in support of research efforts, offering engineering expertise from the special vantage point of the pilot, and recommending engineering solutions to identified problems.
- d. Analyzing and evaluating test results and preparing sections of research reports.
- e. Serving as instructor pilot and/or flight examiner on initial checkout flights, standardization check flights, and instrument check flights for those required to maintain proficiency.
- f. Providing real-time aircraft support to manned spaceflight missions.

2. The work requires a detailed knowledge of, and extensive experience in, aircraft operations, especially high performance, and extended envelope fixed-wing and/or rotary-wing experimental aircraft. In addition, the work also requires knowledges of and proficiency in aeronautical engineering and related engineering and scientific fields.

## **AST - Launch and Flight Operations: 745-11**

### **OPM Title - Launch and Flight Operations:**

#### **GS-801-0**

1. a. This specialty includes positions which involve planning, developing, coordinating, and directing aerospace flight vehicle launch and landing operations. Both the launch and flight operations associated with aerospace test flights of short duration, such as probes and ballistic shots, are usually combined and handled by one position. Such positions are included in this specialty.

b. Generally, this work involves functions such as:

(1) Planning for prelaunch, launch, and landing activities, which include familiarization with the total space vehicle system, and the flight objectives.

(2) Development of procedures for preflight assembly and checkout of the space vehicle and its major systems.

(3) Development of a launch and landing plan which includes range safety plans and procedures; countdown procedures; arranging necessary range support, such as instrumentation, data handling, range clearance, tracking, and the participation, if required, of cooperating agencies; actual launching of the space vehicle, and the activities immediately following the launch.

(4) Preparation of landing facilities and supporting operations; evaluation of the launch and landing including preparation of reports of the operation.

2. Engineering knowledges required to perform this work cut across conventional disciplines such as mechanical, electrical, electronics, aerospace, and chemical.

**AST - Aircraft Mission Operations: 745-12**  
**OPM Title - Aircraft Mission Operations: GS-801-0**

1. This specialty includes positions which involve planning, developing, directing, and coordinating the activities necessary to conduct research and experimental missions aboard aircraft. Such missions employ aircraft as flying laboratories for sensor and experiment development for manned and unmanned spacecraft and for in situ and remote measurements for research in fields such as astronomy, earth resources, ocean processes, air quality, upper atmosphere, meteorology, materials processing, life sciences, and communications. Airborne facilities involved in such missions include, but are not limited to, specially equipped U-2, ER-2, C-130, CV-990, C-141 and Learjet aircraft. The work includes elements of the following:
  - a. Coordination with scientific investigators for aircraft scheduling, considering such matters as budget and human resources availability, aircraft capabilities, and experiment requirements.
  - b. Developing and conducting investigator orientation and training; developing equipment interface and operational constraints; and establishing and enforcing safety procedures.
  - c. Detailed payload planning, integration, installation, and safety verification.
  - d. Ensuring availability of aircraft and flight and ground crews; mechanical and electronic design engineers; photographic, instrumentation, and shop technicians; and computer programmers and operators.
  - e. Engineering design and implementation of changes and modifications for the facility necessary to meet the needs of the investigators.
  - f. In conjunction with flight and ground crews, defining flight routes and development sites to meet the mission objectives. Arranging for logistics support at deployment sites, domestic and foreign, and obtaining necessary diplomatic clearances.
2. The work requires knowledge of aircraft mission operations, aircraft performance capabilities and safety requirements, together with knowledge in engineering or the physical sciences in order to understand the nature of the investigator's research. The work also requires an ability to work effectively with such investigators, domestic and foreign; with domestic organizations, e.g., other Government agencies, universities, and airport officials; and with overseas organizations, such as U.S. embassies and foreign officials.



*Last Modified: 4/2/2001*

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